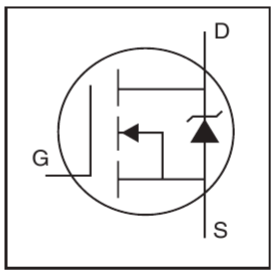
International
IOR Rectifier

PD - 95100

IRF530NSPbF
IRF530NLPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free



V_{DSS} = 100V

$R_{DS(on)}$ = 90mΩ

I_D = 17A

Description

Advanced HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve extremely low on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET power MOSFETs are well known for, provides the designer with an extremely efficient and reliable device for use in a wide variety of applications.

The D²Pak is a surface mount power package capable of accommodating die sizes up to HEX-4. It provides the highest power capability and the lowest possible on-resistance in any existing surface mount package. The D²Pak is suitable for high current applications because of its low internal connection resistance and can dissipate up to 2.0W in a typical surface mount application.
The through-hole version (IRF530NL) is available for low-profile applications.



D²Pak
IRF530NSPbF



TO-262
IRF530NLPbF

Absolute Maximum Ratings

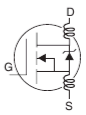
	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V ⑦	17	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V ⑦	12	
I_{DM}	Pulsed Drain Current ①⑦	60	
P_D @T_A = 25°C	Power Dissipation	3.8	W
P_D @T_C = 25°C	Power Dissipation	70	W
	Linear Derating Factor	0.47	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
I_{AR}	Avalanche Current①	9.0	A
E_{AR}	Repetitive Avalanche Energy①	7.0	mJ
dv/dt	Peak Diode Recovery dv/dt ③⑦	7.4	V/ns
T_J	Operating Junction and	-55 to + 175	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	2.15	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mounted,steady-state)**	—	40	

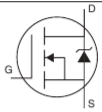
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.11	—	V/°C	Reference to 25°C, I_D = 1mA ⑦
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	90	mΩ	V_{GS} = 10V, I_D = 9.0A ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	12	—	—	S	V_{DS} = 50V, I_D = 9.0A④⑦
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	µA	V_{DS} = 100V, V_{GS} = 0V
		—	—	250		V_{DS} = 80V, V_{GS} = 0V, T_J = 150°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -20V
Q_g	Total Gate Charge	—	—	37	nC	I_D = 9.0A
Q_{gs}	Gate-to-Source Charge	—	—	7.2		V_{DS} = 80V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	11		V_{GS} = 10V, See Fig. 6 and 13 ⑦
$t_{d(on)}$	Turn-On Delay Time	—	9.2	—	ns	V_{DD} = 50V
t_r	Rise Time	—	22	—		I_D = 9.0A
$t_{d(off)}$	Turn-Off Delay Time	—	35	—		R_G = 12Ω
t_f	Fall Time	—	25	—		V_{GS} = 10V, See Fig. 10 ④⑦
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	920	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	130	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	19	—		f = 1.0MHz, See Fig. 5 ⑦
E_{AS}	Single Pulse Avalanche Energy②⑦	—	340⑤	93⑥	mJ	I_{AS} = 9.0A, L = 2.3mH



Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	17	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)①	—	—	60		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 9.0A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	—	93	140	ns	T_J = 25°C, I_F = 9.0A
Q_{rr}	Reverse Recovery Charge	—	320	480	nC	di/dt = 100A/µs ④⑦
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				



Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② Starting T_J = 25°C, L = 2.3mH R_G = 25Ω, I_{AS} = 9.0A, V_{GS}=10V (See Figure 12)

③ I_{SD} ≤ 9.0A, di/dt ≤ 410A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 175°C

④ Pulse width ≤ 400µs; duty cycle ≤ 2%.

⑤ This is a typical value at device destruction and represents operation outside rated limits.

⑥ This is a calculated value limited to T_J = 175°C .

⑦ Uses IRF530N data and test conditions.

**When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994